Case Study: MMM (NHS Hospital in South-East England)

Compact water treatment system helps power the newest and most modern NHS hospital sterilisation and decontamination unit

An ageing sterile services department at a large NHS Hospital in South-East England, was starting to cause issues, requiring increased interventions and repairs. Regular equipment breakdowns and slow instrument reprocessing rates were starting to negatively impact theatre operations and increase running costs. A multi-stakeholder project was undertaken to develop a solution to deliver a new state-of-the-art, modular hospital sterilisation and decontamination unit, with new water treatment systems.

Multi-stakeholder approach

The Trust met with a specialist modular building company, and MMM Group, a leading UK provider of sterile services decontamination equipment, to find a solution. Together, the teams designed a new modular facility to be built off-site, fitted out with all the specialist equipment, tested, dismantled and then transported to the Hospital in prefabricated sections. By incorporating a modular design with off-site construction, installation, commissioning and validation, times were dramatically reduced and disruption on-site was avoided.

The new sterilisation and decontamination unit allows the hospital to maintain and improve its own sterile services function, while also providing a service for other NHS Trusts in the surrounding area.

Taking the modular approach for straightforward installation

Envirogen put forward a solution using the proven EcoSoft water softener range and the new EndoTherm Duo Modular compact RO range. Envirogen also provided all the ancillary pre-treatment filters, back-washable carbon beds, feedwater break tanks, distribution tanks and the orbitally-welded RO stainless-steel ring main. All key components of the water treatment plant were duplexed to provide standby cover during any repairs or routine maintenance. RO plant reliability was critical, as with no purified water, no instrument reprocessing would be possible.

The EndoTherm Duo Modular range is based on three prefabricated skids - the first holding the duplex RO equipment, the second containing the treated water storage and distribution tank and the third comprising the distribution pump and filtration skid. All of these skids are available in varying sizes but for this project a duplex 1,800-litres-per-hour (l/h) RO was selected along with a 1,000-litre capacity treated water tank and 120-litres-per-minute (lpm) duplex recirculation pump set. To provide fast wash cycles, the RO ring main temperature was elevated to between 65°C - 75°C using an inline steam-plate heat exchanger.

The whole process is controlled via the easy to navigate HMI screen with various levels of user-specific personal identification numbers (PINs) - to prevent unauthorised staff from making changes. This PLC was also fitted with a remote digital monitoring device enabling remote access by Envirogen's service and support team. This functionality means some plant settings can be adjusted off-site, enabling fast preventative maintenance activities and minimising any equipment downtime.

"The Envirogen project team liaised closely with the specialist modular building company and MMM project teams to ensure that disruption to the hospAnital was minimal" explains Allan Wigglesworth, Envirogen Healthcare Manager. "Hospitals are always busy and congested environments. New plant needs to be installed and commissioned quickly with minimal interference with day-to-day activities. The initial, off-site installation of the hospital sterilisation and decontamination unit, along with the water treatment system, resulted in a very fast final commissioning stage".

The solution included:

- **EcoSoft duplex softener system** - designed to produce a high flowrate of softened water to feed the RO system and all the soft process water for the fast-cycle instrument washers and pre-wash sinks.
- **EndoTherm Duo Modular duplex RO system** - to deliver 1,800 l/hr of purified water per stream. In duty/assist running mode, the system can deliver up to 3,600 l/hr.
- **120-metre orbitally welded stainless-steel ring main** - with nine separate points of use for each of the washers, irrigators and steam generators.
- **Comprehensive monitoring with touch screen HMI** along with remote diagnostics via the remote digital monitoring system.

An Envirogen Group EndoTherm Duo Modular reverse osmosis system.

Speed, quality and compact design are key drivers

Brian Mitchell, Managing Director, MMM Group, explains: “Speed, quality and space are the main factors we look for when choosing water treatment solution providers. These fast-cycle instrument washers are being used for medical equipment sterilisation so the water supply needs to be extremely pure. Since the hospital sterilisation and decontamination unit will be used to service other local hospitals too, the flow rates need to be maximised to keep the washers and irrigators working even at peak times. Envirogen designed and installed duplex models to double the output when needed, providing continuous flow at all other times as one system provides full duty while the other is serviced or maintained. Even when routine filters are replaced, there is no interruption to the decontamination equipment.”

“The compact, skid-based, modular design meets our third main requirement. In modular hospital sterilisation and decontamination units, space is at a premium. These units are usually designed for small areas outside of the main hospital building. You need to preserve as much of the space as possible for operators to perform their jobs inside the unit. The modular approach taken by the Envirogen team certainly helps to achieve this along with the compact design of our hospital sterilisation equipment.”

Just three months from contract to commissioning

“We installed the whole water treatment system in the mobile unit, off-site, in little under four weeks and then commissioned it in under two weeks at the hospital,” states Sam Blakemore, Project Manager, Envirogen. “And the system was designed and built in just two months. Much of this work needed to take place during the first Covid-19 lockdown and at a time when the Hospital was under a great deal of pressure. We worked with multiple stakeholders from MCH, MMM Group and the Hospital Trust to ensure that the project was completed on time and to budget.”

The hospital sterilisation and decontamination unit was officially opened on 29 July 2020 and is now delivering medical device sterilisation for all theatres in the main Hospital, as well as surrounding hospitals and NHS trusts. Envirogen engineers continue to provide ongoing service and maintenance services on-site, ensuring the system continues to deliver strong efficiencies, reliable service and a low total cost of ownership.

The end user concludes: “This project has been quite a remarkable feat of engineering. When we saw 16 modules arrive on-site in early April 2020, we couldn’t have imagined that just four months later we would have the newest and most modern sterile service department in the NHS.”

“The safety of our patients is of paramount importance to us and our new sterile services unit will help us to ensure we continue to provide the highest levels of safe and compassionate care.”

Key outcomes

- Compact EcoSoft duplex softener and EndoTherm Duo Modular duplex RO system built and installed in just three months.
- Complete purification system supplying nine pieces of decontamination equipment through a centralised stainless-steel ring main.
- Purified water certified to HTM01-01 and ISO15883 standards.
- HMI, full-colour touchscreen with secure user access shows real-time data and enables simple maintenance tasks to be carried out remotely.
- Data is backed up on a removable USB stick for data transfer and further performance interrogation.
- PureCare service and maintenance package ensures operational efficiency and a low total cost of ownership.
- The Hospital can now maintain and improve its own sterile services function, while also providing a service for other NHS trusts in the surrounding area.
- Collaboration, multi-stakeholder engagement and specialist water treatment support was ensured throughout the project.

About the client

MMM Group is a world-leading manufacturer and supplier of medical equipment sterilisation and disinfection technology for use in the healthcare, laboratory and pharmaceutical sectors. Established in 1954 the company now has more than 1200 employees worldwide.

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